

IDEAS TECHNOLOGY DESIGN BUSINESS

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EARLY ADOPTERS



What's exciting...
AYDOGAN OZCAN
Associate professor
University of California

"The small camera in some smartphones camera now reaches up to 40 megapixels. This opens up exciting opportunities for telemedicine. Microscopic images of cells can be computed from their live shadows, using a simple illumination setup, such as Holma's **LUCAS** microscope. Installed at the back of a regular camera phone."



What's exciting...
JENNIFER PARKKA
President
Data for America

"According to Tim O'Reilly, the UK government's **Digital Service Design Principles** is the most important design document since Apple's original Human Interface Guidelines. When we have interfaces to government that are simple, beautiful and easy to use, we have a very different society."



What's exciting...
JANK NI
DHULCHADITIGI
President, Agari

"**HaloGo** is an iOS app for anyone who craves the nuances and randomness of everyday mobility—bikers, hikers, skiers and anyone who pays attention to how we do stuff. Take a series of photos with eight-second snippets of sound—the cameras make HaloGo so much more

1. FAN CASE
The fan-blades' tips steer the lining of the aluminium case by less than 3mm. The 3m-diameter fan spins at 2,700rpm; the tips move at over 1,450kph with a centrifugal load of 90 tonnes on each blade.

2. FAN BLADES
The fan draws in air and feeds it in the turbine core, delivering 80 per cent of the engine's thrust. Twenty hollow titanium blades suck in 1.25 tonnes of air per second at take-off.

3. COMPRESSOR
Fourteen further pressure stages (rotating blades and static vanes) send compressed air to the combustor. Cold air is squashed to up to a 50th of its size, which raises its temperature to more than 700°C.

4. SENSORS
Sensors measure pressure, vibrations, temperatures and other data. Data from thousands of airborne Trent engines is transmitted to Rolls-Royce's operation centre in Derby to

An engine!
Trent XWB
20,000 lbs
first crack



Greener, faster Roller

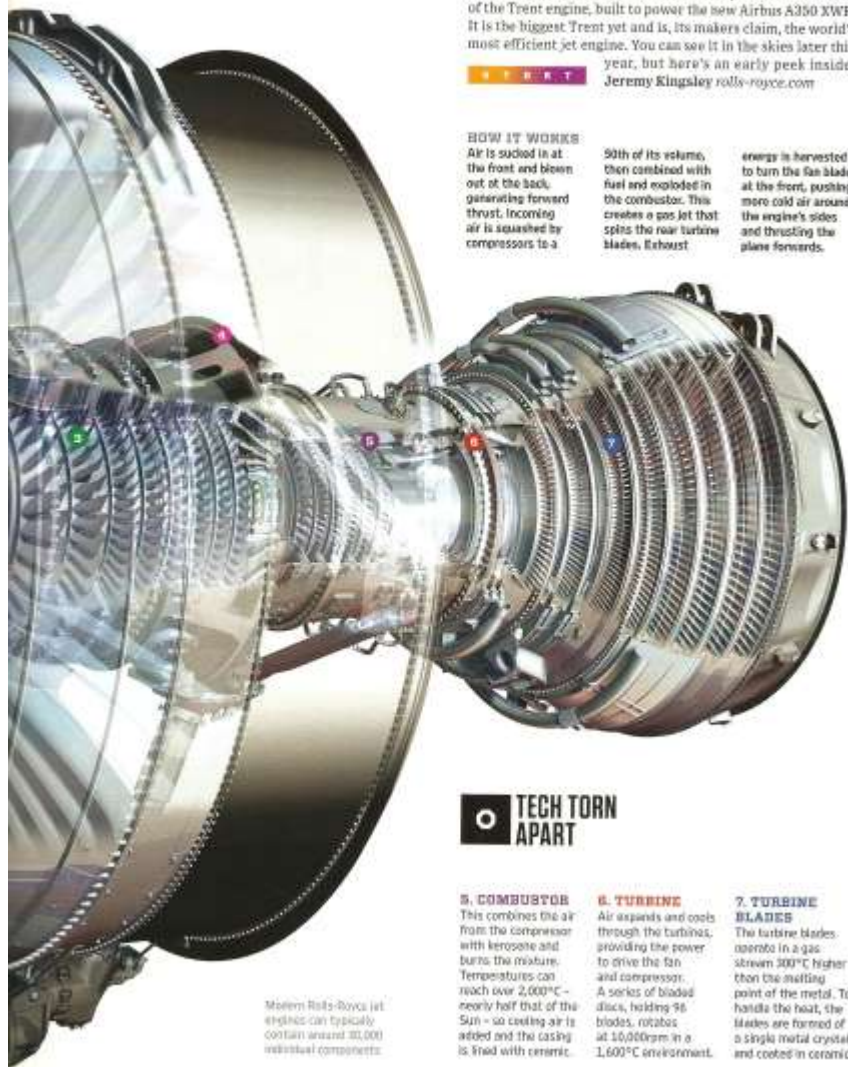
This Rolls-Royce engine is designed to make flying cleaner and more efficient

The XWB (Extra-Wide Body) is Rolls-Royce's latest variant of the Trent engine, built to power the new Airbus A350 XWB. It is the biggest Trent yet and is, its makers claim, the world's most efficient jet engine. You can see it in the skies later this year, but here's an early peek inside.
SECRET
Jeremy Kingsley rolls-royce.com

HOW IT WORKS
Air is sucked in at the front and blown out at the back, generating forward thrust. Incoming air is squashed by compressors to a

50th of its volume, then combined with fuel and exploded in the combustor. This creates a gas jet that splits the rear turbine blades. Exhaust

energy is harvested to turn the fan blades at the front, pushing more cold air around the engine's sides and thrusting the plane forwards.



Modern Rolls-Royce jet engines can typically contain around 30,000 individual components.

TECH TORN APART

5. COMBUSTOR
This combines the air from the compressor with kerosene and burns the mixture. Temperatures can reach over 2,000°C—nearly half that of the Sun—so cooling air is added and the casing is lined with ceramic.

6. TURBINE BLADES
Air expands and cools through the turbines, providing the power to drive the fan and compressor. A series of bladed discs, holding 96 blades, rotates at 10,000rpm in a 1,600°C environment.

7. TURBINE BLADES
The turbine blades operate in a gas stream 300°C higher than the melting point of the metal. To handle the heat, the blades are formed of a single metal crystal and coated in ceramic.